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FOR

WIRELESS NAME SERVICE

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WIRELESS NAME SERVICE

1. Field of the Invention

The invention relates generally to wireless telephony. More specifically, the invention relates to dialing and directory mechanisms for wireless telephony.

2. Background

Wireless telephony devices such as cellular telephones utilize a service provider's network to place and receive phone calls and, in recent vogue, download informative data such as stock quotes, news, etc. Once placed into service (i.e. activated for use), a wireless telephony device is assigned by a seven or ten (including three-digit area code) telephone number. This number will remain while the user retains the same service provider. Often, however, due to changes in technology, dissatisfaction with quality of service, changes in pricing, and so on, a user will change their service provider. The change in service provider, even for the same geographical area, will yield in a new cellular telephone number.

Additionally, cellular telephone numbers are often kept private for security reasons and to prevent unauthorized cold-calling. Due to their changing nature and privacy concerns, they are not published in any directory which is accessible to others. Further, there is no operator-provided directory assistance for such numbers. Even where such directories and assistance are

available for traditional wire-based (POTS-Plain Old Telephony Service) telephone numbers, printed directories or those published on the Internet, are often not updated with much regularity. Further, the user/building whose number is being indexed is not allowed to provide input when that POTS number changes as it does when the user moves residence. Thus, today's printed directories are sometimes out-of-date with regard to a particular user. Even those published online are derived from static listings that may be six or more months old by the time they are published, and thus are also out of date. Corporate changes in telephone numbers, extensions and locations of employees is often even more pronounced.

Further, telephone numbers are difficult to memorize for many. For this reason, cellular and PSTN-based telephones have both been equipped with memory storage so that frequently called numbers may be recalled. Cellular telephones have the added advantage of showing names associated with phone numbers and of allowing search and recall by the name of the person rather than the number. Another advantage is that cellular telephones can store the number from an incoming or outgoing call with a few keystrokes. Even with such features, it may be desirable to replace the paradigm of telephone "numbers" and even, of people's names, as a means of identifying, since names may not be unique and cellular numbers change. It may also be desirable to have a single, unique point of reference with which to store and collect a variety of information about a user, one that can be easily

SUMMARY

The invention enables a wireless telephone or other communication device to enter a unique string identifier such as an e-mail address. When entered on the communication device, a
5 Wireless Name Service server is contacted. The WNS server responds to the communication device with a telephone number that is associated with the string identifier in its database. This telephone number may then be used to place a call on the communication device by a variety of methods.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects, features and advantages of the method and apparatus for the present invention will be apparent from the following description in which:

5 **Figure 1** is a system diagram according to one or more embodiments of the invention.

Figure 2 is a flowchart of communication via Wireless Name Service technology as presented in one or more embodiments of the invention.

10 **Figure 3** is an illustration of a table utilized in a Wireless Name Service Server.

DETAILED DESCRIPTION

Referring to the figures, exemplary embodiments of the invention will now be described. The exemplary embodiments are provided to illustrate aspects of the invention and should not be construed as limiting the scope of the invention. The exemplary embodiments are primarily described with reference to block diagrams or flowcharts. As to the flowcharts, each block within the flowcharts represents both a method step and an apparatus element for performing the method step. Depending upon the implementation, the corresponding apparatus element may be configured in hardware, software, firmware or combinations thereof.

The wireless name service, which is the subject of one more embodiments of the invention, delivers telephone numbers and other information based upon the e-mail address of the target user. The e-mail address has many advantages over names and numbers. E-mail addresses are always, by definition, unique unlike names. E-mail addresses, unlike telephone numbers and addresses and even names (of people changing their name due to marriage), often never change because business and casual users use the e-mail address as a permanent point of contact, and thus the user is unlikely to change it. E-mail addresses are easier to memorize than numbers and even, first and last names, since these can be more easily confused and transposed. E-mail addresses often identify a geographical place, profession or name

of business in its server name identifier, and thus can be more easily be associated. For instance, if a user want to contact someone at a business named XYZ, Inc. whose name is John, his e-mail address may be john@xyz.com. This is much easier to

5 remember than "331-456-7612" which may be telephone number or even his name, since there may be many with the first name "John" known to the user.

To attain these advantages, the wireless name service defines both a method of transferring telephone numbers and a
10 method of indexing them. At some server machine, a database is maintained which relates for each record a unique primary key consisting of an e-mail address string to at least one number such as the cellular telephone number. On a wireless device or even a computer telephony device, the input by entering, speaking
15 or clicking on (through some activation means) a string representing the e-mail address will trigger a response from the server sending the cellular telephone number back to the device. The means of responding with the cellular telephone number may be WAP (Wireless Application Protocol) in the case of the device
20 being wireless. In the case of the device being a computer system or other information device, HTTP (Hypertext Transport Protocol) may be used. Where privacy of the actual digits of the telephone number is important to preserve, the response may be encrypted, scrambled or transferred directly into the dialing
25 mechanism of the device so that the user of the device never sees the actual digits. On phones that do not have WAP, the service

provider could provide a channel for transferring the number associated with the e-mail address through SMS (Short Message Service) or any of the other many control and data channels available to it.

5 Whatever the input, data transport mechanism or the dialing mechanism, the fundamental concept is the triggering of telephone number information by using the e-mail address of the call recipient as the triggering key. In one embodiment of the invention, a wireless internet calling device (WIC) with a
10 connection to the Internet can access a WNS (Wireless Name Service) server to retrieve/return a telephone number stored in a record by accessing the primary key (memory address) of an e-mail address. With the number retrieved, the WIC can automatically place the call and/or store the number for future use. Where
15 more than one number is available for a given e-mail address key, meaning that the user assigned to the e-mail address has more than one listed phone number, the WIC will device will receive each number in turn until a connection is established. In one embodiment of the invention, there may one or more centralized
20 WNS servers that contain mappings for an entire e-mail address. In yet another embodiment, the WNS can be distributed across the providers of the e-mail addresses themselves. Thus, in the exemplary e-mail address "john@xyz.com", a WNS server for "xyz.com" may be contacted to attain the telephone number
25 associated with user "john". A distributed WNS server may also allow quicker and more efficient implementation of a private

corporate intranet directory system that focuses on users and departments as the trigger for telephone numbers, extensions, etc.

While the name "wireless Name Service" has been applied to describe this invention, in many other embodiments, the information returned may be PSTN telephone numbers, physical addresses or any number of data and documents. Also, while the name "Wireless Name Service" implies that access is by wireless devices, non-wireless devices (such as a personal computer) can use the same mechanism, perhaps with greater effectiveness, to access information. For instance, the personal computer may be programmed to call/ping the WNS server(s) upon the clicking of an e-mail address in any application. The WNS has thus the potential of eliminating the concept of dialing a phone number that is associated with Internet-based telephony. While the computer, may, like certain wireless access devices, store a list of names and associated numbers, these static lists can be replaced altogether or periodically enhanced by verifying the accuracy and current-ness of the information in the list.

Figure 1 is a system diagram according to one or more embodiments of the invention.

A Communication Device 110 such as a cellular telephone or Internet telephony device or other telephony capable system may utilize the wireless name service to contact automatically or retrieve the telephone number of any other communication device.

In one embodiment of the invention, the e-mail address 132 that belongs to or is associated with a Target Call Recipient 130. The caller that uses Communication Device 110 can input e-mail address 132 (through input means such as voice, keyboard, mouse click etc.) into the Communication Device 110. This e-mail address 132 is then transmitted to a Wireless Name Server 120 which is a database, table or other information store that contains a telephone number related to that e-mail address 132. To enable this, the Target Call Recipient 130 will have within the Wireless Name Server 120, an entry that relates the e-mail address 132 with the TCR's (Target Call Recipient's) number 135.

This relationship between e-mail address 132 and TCR's number 135 is maintained in advance of the call pictured in **Figure 1**. The Wireless Name Server 120 may store many such e-mail addresses along with a telephone number for each. In addition, as will be described in greater detail below, other information in addition to the telephone number of the Target Call Recipient may be stored on the Wireless Name Server. The key trigger for retrieving such information is the use of an e-mail address.

In response to the e-mail address 132, the TCR's Number 135 is transmitted from the Wireless Name Server 120 to the communication device 110 using WAP or SMS or other appropriate service/protocol. Once the TCR's number 135 is received by communication device 110 then the call is ready to be connected.

In one embodiment, the number 135 is displayed in the display area of the communication device 110 and then can be

automatically dialed so that communication device 110 may connect with the Target Call Recipient 130. Also, the number 135 thus received could be stored in a directory or memory of the communication device 110.

5 In another embodiment of the invention, the actual digits of number 135 is not displayed anywhere on the communication device 110, but may be transmitted from Wireless Name Server 120 directly into an internal memory of communication device 110 so that it is dialed, but not displayed thereon. In yet another
10 embodiment, the number may appear in a scrambled or encrypted code so that the actual number is not displayed, nor transmitted in its true form. In such embodiments, it may be possible for the Target Call Recipient 130 to specify whether the number should be displayed to the communication device 110. The Target
15 Call Recipient 130 will typically be a cellular telephone, but may also be another telephony device such a facsimile, pager, or POTS telephone.

Figure 2 is a flowchart of communication via Wireless Name Service technology as presented in one or more embodiments of the
20 invention.

First, the call originator (one who wishes to place a call) inputs an e-mail address on their cell (cellular) phone (block 210). The input may be achieved by voice (i.e. speaking or spelling out of the e-mail address) or through the input keys of
25 the cell phone or by a selecting of the e-mail address which may

be in a list or directory. The input e-mail address is then transferred to a WNS (Wireless Name Service) Server (block 215). Using the e-mail address as a key (index address), the WNS server looks up the phone number in the same row of the table indexed by the e-mail address (block 220). The WNS server then returns the phone number to the cell phone (block 230). The cell phone then uses the phone number returned from the WNS server to call the target recipient that the user of the cell phone wishes to connect with (block 235). The cell phone may also be automatically connected to the target via a switching device, which receives the number instead of the cell phone and then connects to the target on its behalf.

Figure 3 is an illustration of a table utilized in a Wireless Name Service Server.

Figure 3 shows a Wireless Name Service (WNS) Server Table 300 that may be embedded or stored into a database or flat file or other data storage mechanism. The WNS Server storing Table 300 may be accessible via IP (Internet Protocol) or through touch tone signals such as DTMF (Dual-Tone Multi-Frequency) which are available to most telephone systems. The Table 300 is indexed and addressed by a Key field which consists of e-mail addresses and may also consist of keywords, or names of businesses.

Table 300 shows a first entry that has as its key field the e-mail address string "john@xyz.com". When "john@xyz.com" is detected as an input to the WNS server, the WNS Server matches

the string with the Key field. After a successful match, the WNS Server retrieves the phone number in the "Cellular/Main" column intersecting the row for the Key "john@xyz.com". According to Table 300, the retrieved phone number for the e-mail address "john@xyz.com" is "123-345-4566". In one embodiment of the invention, the retrieved number "123-345-4566" is returned to the device that originated the look-up by sending the e-mail address. In another embodiment, the retrieved number "123-345-4566" may be first scrambled/encrypted or sent without displaying it on the device. In another embodiment of the invention, other information related to the owner of the e-mail address "john@xyz.com" may also be sent to the device originating the input of the e-mail address to the WNS server. Entry 310, for example, also has the e-mail address owner's name "John Jetson", which may be sent along with the listed number. This information may thus be automatically downloaded into the information device upon that device sending the simple string "john@xyz.com" as a key.

The advantage of using e-mail addresses as a key to the information in the WNS server is that e-mail addresses are by definition, strings that uniquely identify one person or entity without possibility of repetition. While there may be two persons with the name "John Jetson", only one such persons have the e-mail address "john@xyz.com". Having knowledge of this e-mail address can allow a communication device to connect to the telephone of "john@xyz.com" in an automated fashion. Further,

the e-mail address may be used to retrieve a multitude of information such as an e-mail holder's name, address, job title, company, etc. The entry having "ed@abc.com" as its key 320 may when retrieved return the phone number "234-456-6789" as well as a secondary telephone number "234-789-9876", the name of the e-mail address hold "Ed Eddie" and the address of "111 Main Street". This differs from many other directory services in that the uniqueness of the string is guaranteed by the database requirement imposed upon server Table 300 that all primary keys be unique when their entries are created.

Corporations or institutions may have valuable information stored on the WNS server for retrieval by a handheld communication device, cellular phone or other such device. Table 300 shows the example of ABC, Inc., a company with two branch locations. The information for the first of these locations is contained in an entry whose Key 330 is "ABC-First". Comparing this key with the Key 340 indexing the second of the ABC, Inc. branch locations "ABC-Third", these keys are different when compared in their entirety. While each of these entries has the same Name field "ABC, Inc.", their addresses and phone numbers are different. The second branch location has its address at "333 Third Avenue" and thus, was assigned a Key 340 of "ABC-Third" in order to indicate its location. Likewise, the first location indexed by Key 330 is "ABC-First" to indicate its address on "111 First Avenue". Each Key is unique and does not have to be an e-mail address but may be a place locator or other

identifier that indicates some unique property about the entity. Thus, when "ABC-First" is transmitted from a communication device to the WNS Server, a look-up of Table 300 would return the phone number "111-222-3333". When "ABC-Third" is transmitted from a communication device to the WNS Server, a look-up of Table 300 would return the phone number "222-999-9999". The designation of Keys shown is merely exemplary, but each Key in a given WNS table should be unique.

Place names and company names are some of among the many types of strings that may be used as Keys for phone number/information entries. Another form of a indexing Key refers not to the specific but to the general. Keywords, such as books, CDs, music, etc. may be used to identify specific stores, companies, services, etc. uniquely. WNS Server Table 300 shows a keyword Key 350 "books". Thus, when a communication device sends the string "books" to the WNS server, the number "555-444-9999" of "Bookstore" would be returned to the communication device allowing the user to connect, store or view that phone number.

Keywords as a Key may be reserved like any other unique string such as an e-mail address. A given keyword may refer to only one entity such as the "Bookstore" with phone number "555-444-9999". However, the entity Bookstore may reserve for its use more than one Key, such as "book" or "text" in addition to "books".

The exemplary embodiments described herein are provided merely to illustrate the principles of the invention and should not be construed as limiting the scope of the invention. Rather, the principles of the invention may be applied to a wide range of systems to achieve the advantages described herein and to achieve other advantages or to satisfy other objectives as well.